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THE MINERALOGICAL SOCIETY

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THE

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AND

Journal

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LOCAL MEETING

Held at the Laboratory, Camborne, on Monday, December 18, 1876, *at* 12 *noon.*

Dr. C. Le Neve Foster, F.G.S., in the chair.

The following papers were read:—

On some new mineral localities in Cornwall and Devon, by the chairman.

On Gramenite from Smallacombe in Devon, and on the chloropal group of minerals, by J. H. Collins, F.G.S.

On a curious form of tin ore from Wheal Uny, near Redruth, by B. Kitto, F.G.S.

A defence of Turner's method of detecting boracic acid, by the chairman.

The following specimens were exhibited:—

By the Chairman. Scheelite from Levant Mine, St. Just; Apatite from Wheal Kitty, St. Agnes; Bismuthine from Penhalls Mine, St. Agnes; Chiastolite slate, from Bosworgey Mine, St. Erth; Leucopyrite from Pednandrea mine; sections of tin capels, &c., from Penhalls and Wheal Uny.

By Mr. J. H. Collins. Gramenite from Smallacombe; Laurentian Serpentine, with *Eozoon Canadense.*

By Mr. B. Kitto. Tin Ore from Wheal Uny; Pseudomorphous quartz in fine obtuse rhombohedrons (presumably after chalybite) from East Pool Mine.

By Mr. A. K. Barnett. Blende of unusual appearance from Botallack; Pseudomorphous quartz (hollow octahedrons) from Gwennap.

Mr. Collins the Honorary General Secretary, stated that the following books and specimens had been received, and would be

available for the use of the members as soon as proper regulations had been drawn up by the council, viz.—

BOOKS.

Royal Society of New South Wales, Sydney.—Transactions of the Philosophical Society of New South Wales, 1862-5.

On the transmutations of Rocks in Australasia, by the Rev. W. B. Clarke, M.A., F.G.S.

On Osmium and Iridium obtained from New South Wales Gold by A. Leibius, Ph.D.

Transactions and Proceedings of the Royal Society of New South Wales.

Anniversary Address by the Rev. W. B. Clarke, M.A., F.G.S.

Facts in American Mining, by S. L. Bensusan.

Stanniferous Deposits of Tasmania, by S. H. Wintle.

Examples of Pseudo-crystallization, by Prof. Liversidge.

The Minerals of New South Wales, by Prof. Liversidge.

Mines and Mineral Statistics of New South Wales.

Notes on the iron and coal deposits and on the diamond fields, by Professor Liversidge.

Mineral Map and Statistics of New South Wales.

The Resources of New South Wales.

Meteorological Observations, Sydney Observatory, 1873.

Prof. How, D.C.L.—The Mineralogy of Nova Scotia, 1868, by Henry How, D.C.L.

Contributions to the Mineralogy of Nova Scotia, 1876. *Centrallassite, Stilbite, Sphærostilbite, &c.*

Reale Comitato Geologico d' Italia.—Bolletino, Nos. 9, 10, 1876.

SPECIMENS.

Marshall Hall, F.G.S.—Section of basalt from Mid-Atlantic, with small fragment of the same. (See Min. Mag. No. 1.)

J. H. Collins, F.G.S.—Section and fragment of Calcite containing oxide of iron from the Mwyndy Mines, S. Wales. (See Min. Mag. No. 1.)

The following members and associates have been elected since the Glasgow meeting, viz.—

MEMBERS.

PROF. HARKNESS, Queen's College, Galway.
PROF. CRUM BROWN, University of Edinburgh.
MR. JOHN GILCHRIST CLARK, Speddock, Dumfries, N.B.
MR. R. TREGASKIS, Fore Street, Redruth.

ASSOCIATES

MR. W. L. ROWE, The Bank, Redruth.
MR. WM. THOMAS, Cook's Kitchen Mine, Camborne.
MR. WM. RICH, Redruth.
MR. CORNELIUS BERINGER, Redruth.

THE MINERALOGICAL MAGAZINE

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MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND.

No. 3. FEBRUARY, 1877. Vol. 1.

I.—*The Val d'Anniviers.*

By Marshall Hall, F.G.S.

Member of the Alpine Club.

I HAVE, when travelling, so often wished for some little indication of the scientific features of the country, beyond the meagre information of the guide book, that it occurs to me to suggest collaboration amongst mineralogists for mutual information.

With a view to this, could we not agree to take some localities and work out their details, spending our holidays in un-hackneyed districts, at quiet inns and in fresh air, each reporting his results succinctly in the Mineralogical Magazine, with a sketch map where wanted?

As a little-worked-out place, I for my part nominate the Val d' Anniviers or Einfischthal, leading from the town of Sierre, in the valley of the Rhone, at nearly right angles to it, into the very heart of some of the sublimest scenery of the Swiss Alps, and, as it will be seen, affording great facilities for meteorological, botanical, geological and mineralogical studies, economical quarters, warm-hearted people, and excursions and scrambles of every grade of length and difficulty.

I propose now, in imagination, taking my brethren of the hammer and blowpipe to these happy hunting grounds.

But as la Belle France, which has to be traversed, is, comparatively to the mountains, a dull affair, I will suppose us to have taken return tickets for one month, *viâ* Paris to Geneva (the price of which, from Cook the tourist agent, was, this summer, 1st class £8 19s. 0d.; 2nd class £6 13s. 0d.), to have left London early one morning, taken the night train from Paris, and arrived at Geneva about 10.35 a.m., and to have had a comfortable wash and breakfast.

Once at this bright and charming city, with Mont Blanc in the distance, the blue Rhone at our feet (ye chemists and mineralogists solve this problem of blueness!) it is not likely we shall halt on the threshold of the wonder-world, but, leaving the sight-seeing of towns for our return journey, take the afternoon steamer, and, after a voyage, of which the interest increases as we wind eastward, we land at the further end of Lake Leman, take our seats in the train, and, whisking past mountain and torrent, turning the corner of the Valais near Martigny, sacred alike to the geologist and to Ruskin, we arrive in due course at Sierre, and shall probably, before nine in the evening complete our long journey of two days and a night by eating an excellent supper and turning in "for a long watch below" at the clean, comfortable, and moderate Hotel Bauer.

Next morning we proceed, after a not over early breakfast, to make up our knapsacks, and those amongst us who have such things, fulfil a national custom by *posting* any carpet bag or heavy article at the Post Office, directed to ourselves at Zinal; an arrangement so convenient and so much less expensive than the extra horse it would involve, did we not part company with our impedimenta, that I wish the arrangement were adopted in other countries.

We also, at the Post Office, buy a little book, the tariff for carriages, horses, guides and porters, to which we can refer when we wish to make further excursions.

Hiring a light char for each couple of "'ologists" we set out across the fertile Rhone Valley, through the scrubby forest of Pfyn (the ad finis of the Romans) where in 1798 the Valaisans fought a tough fight against the French. We then begin to ascend, by a capitally engineered road, the flanks of limestone mountains. The course we have to make is south, but many a wind of the road opens to us many a varied view of white houses and culture in the valley

and of the outliers of the stern oberland range of peaks and glaciers beyond.

We shall observe the occurrence of carboniferous shales in small quantity, and bad quality. At length reaching the level of the upper valley we turn angle after angle of precipice, passing sundry spots where the lives of road makers have been sacrificed for our present comfort; looking from time to time down the profound ravine sculptured by the wrestling stream of the Navisanche, far below. Even to travellers all but cloyed with the grandeur of the Mont Blanc, Oberland and Monte Rosa ranges, this magnificent drive, perhaps from its very contrast, is most impressive—crede experto. As we approach Vissoye we perceive, on each side of the gorge, junctions of limestone with altered rocks. Of course we may expect to find many of our most interesting prizes at such points. Beyond Vissoye, when I last visited this valley, the char road ended, and a bridle path only existed. Now, very likely, the road is carried on to Zinal. As we advance, the rocks around us become evidently metamorphic, with puzzling alterations of schists and sedimentary strata, which we must make it our duty to unravel so far as we can. Near Ayer, which we soon pass, are the mines of Grand Prat, worked for red nickel and cobalt, and where grey copper ore and copper pyrites occur. Half way hence to Zinal, and on the west side of the valley, is the Corne de Sorrebois, affording a magnificent panorama, easy of access for ladies, greatly helping the knowledge of the geology of this part of the Alps, and having a curious jumble of schists, beds of gypsum, &c.

On both sides, the mountains have become imposing; we feel that we are approaching the great fastnesses of the upper world, whilst the ravine beneath us becomes more and more insignificant and at length ceases. To the east, the Diablons, looking all but inaccessible, and to the west the Garde de Bordon, are the flankers of a mighty group, of which the Weisshorn is perhaps the king.

After some five or six hours from Sierre we reach Zinal, where, at the mountain Hotel Durand we shall find a warm welcome, fair living and moderate prices, always supposing my friend Epiney to be landlord still, and to be still blessed with a wife who makes everybody comfortable, and shews energy enough to manage the Grand Hotel of Paris single handed! The travellers we may meet will not be numerous, but of the right kind, full of information

regarding the mountains, appreciative of scenery, and mostly stalwart about the legs, and *not* anxious to "do" the Alps in three weeks. Still we shall be housed and fare all the better if we have written in advance to Monsieur Epiney.

Before we explore the upper portion of this valley I will mention the principal minerals which I have heard of, or seen, or collected, and I may observe that I have not taken any interest in fine specimens, the existence and mode of occurrence of a substance being to me of an importance overwhelming other considerations. I very much regret to have to confess also that I have carefully and for five years placed my note book concerning the regions in question in such safety, that I am quite unable to lay hands upon it!!!

The list—a most imperfect one—which I give, will show how those who will search this unfrequented district may hope for many trophies of their campaign. Also, the list is chiefly that of minerals occurring in the lower portion of the valley: in the crystalline rocks above Zinal the work has yet to be efficiently done. I have placed a star against such minerals as I have found on the spot, and a dagger against those I have seen and identified, in some instances with analysis.

My list cannot pretend to be at all complete, even so far as already ascertained. The difficulty in getting foreign books in England is disgraceful to our country.

* Earthy Cobalt
* Cobaltite
† Smaltite
Fahlite (Tetrahedrite)
Bismuth Fahlite
† Annivite (var. of Tetrahedrite)
Rammelsbergite
* Sulphide of Nickel (white & red)
Vivianite
Chloanthite
* Nickeline (Niccolite)
* Copper Pyrites (no good crystals)
* Red Hæmatite (locality not identified, but from this valley)
* Quartz (very various)
* Epidote
† Steatite
† Celestine
* Gypsum

Amongst rocks I may mention—

* Talcose Slate
Cargneule
Dolomite
* Carbonaceous Shale
Gneiss—red and other

Above Zinal, we are close upon the great masses of that crystalline mineral—*ice*! At a spot called Mountets, some 3½ or 4 hours' walk from the Inn, is a cabane built by the Swiss Alpine Club for the use of travellers. It is in the middle of a vast amphitheatre

of ice and rock hardly rivalled in the Alps for grandeur and accessibility; the expanse of the Zinal or Durand Glacier lies below, surrounded by many of the most difficult, steepest, and highest of the Swiss Alps, including the Weisshorn, Schallhorn, Rothhorn, Gabelhorn, Dent Blanche, Grand Cornier, Dent des Bouquetins, &c. Here, at an altitude at which continuous meteorological observations are rarely practicable except with such a facility, ought to be established an observatory similar to that on the Col de St. Théodule.

But even now there is a cabin, a pot, and frying pan, to the cleanliness of which I advise my friends to look (once more crede experto), a stove, and some berths similar to those on board a sea going ship. By sending up from Zinal fuel, provisions and wraps, one can, without any hardship and almost without fatigue, spend ones' days in the investigation of the upper ice-world. My mother, then seventy years of age, spent a night there in 1871, and was delighted!

The scene is stupendous, the lights and shadows such as cannot be witnessed at a lower elevation, and the hut forms a good starting point for many excursions and ascents, which, taken from Zinal, would be far more fatiguing.

Here we find the last stages of metamorphism in the form of gneiss. I have been on several points of the high ridge and several peaks south of Mountets, and found these rocks, wherever they appeared through the snow. Those who wish to study the most metamorphosed rocks, Gneiss and Serpentine, should leave this valley by the Glacier pass of Col Durand, starting about 4 a.m. from the cabane at Mountets, and, searching the numerous moraines on the south side of the pass, wend their way to Zermatt, near which they can study Serpentine rocks and the Garnet group.

Having, I fear, much exceeded my space I leave my co-ologists (as many have left their friends before now!), to get back how they can! The problems of this region only will take all the time they will be likely to have it in their power to give. The wonderful series of change in the rocks forms an epitome of the history of metamorphism in itself, which may, of course, be seen elsewhere, but in few places more completely within a moderate walk.

I ought to remind the botanist that the change of rock and soil, and the great range of altitude cause a corresponding variety in the vegetation, and that his vasculum and his store of blotting paper

should be tolerably large. Those who stop for some time could make arrangements by the week on very economical terms, far lower than in any English country Inn that I wot of, let us say from seven to nine francs a day, all, except wine, included.

"Die Minerale der Schweiz," by Dr. A. Kengott, and Professor Studer's "Index der Petrographie und Stratigraphie der Schweiz, &c." will be found useful books.

I hope no man will neglect to take and use a prismatic compass, a clinometer, and an aneroid, and to furnish his successors with plenty of careful cross-bearings and heights.

Suppose some of us try to rendezvous at Zinal, August the first, 1877, for associated work.

II.—"*Remarks on Gramenite from Smallacombe, and on the Chloropal Group of Minerals.*"

By J. H. Collins, F.G.S., *Hon. Sec.*

A FEW years ago, while inspecting some iron ore deposits at Smallacombe, near Bovey Tracey, in Devon, I noticed the occurrence of certain brightly colored green, red and brown clays in considerable quantity.* I took several specimens of the green clay at the time, and on my return home laid them aside in a lumber closet, where they became buried with other specimens, from which they have only lately been disinterred. After so long a stay in a tolerably dry situation I thought they might be regarded as in a normally hygrometric condition, and it was in this state that I subjected then to examination and analysis, with the following results.

Preliminary Examination.—The mineral is unctuous to touch but does not adhere to the tongue, it is somewhat softer than talc. The color is dull green or yellowish green, with a few thin veins of a reddish brown color running through it.

Selecting a piece free from these veins I found the specific gravity was 1·89.

Heated in the matrass it turns dark brown and gives off much water which is neutral to test paper.

Heated on charcoal it becomes dark brown and highly magnetic, but is perfectly infusible.

With borax it gives the usual reactions for oxide of iron, and with microcosmic salt for oxide of iron and silica.

Heated on Platinum foil with carbonate of soda, there is a faint tinge of green, which may be due to a trace of manganese.

Heated in the Bunsen flame, after moistening with HCl, the flame is tinged yellow, and the spectroscope shows the sodium and potassium lines.

* See "Note on the iron ore deposits at Smallacombe. Rep. Miners Assoc. of Cornwall and Devon, 1871, p. 71.

Treated with HCl, HNO_3, or H_2SO_4 the powdered mineral is partially and slowly decomposed and yields a small amount of iron to the solution but is not completely decomposed after 96 hours digestion, 12 being in the heated sand bath.

Treated with solution of caustic potash, the filtered solution diluted, and treated with carbonate of soda, a large amount of alumina is precipitated, showing that it is present in a freely soluble state.

Analysis—3 grams of the mineral scraped in fine shavings was placed over oil of vitriol in a dessicator for 96 hours—by which time it had lost 11·58 p.c. of weight; a further exposure for 12 hours did not reduce the weight. On heating the dessicated mineral for 2 hours at a temperature of 105°C, there was a second loss of 7·22 p.c on the original weight, and on igniting the residue a third loss of 6·61 p.c. The ignited residue was then rubbed up in an agate mortar with 4 times its weight of fusion mixture, and fused in a Platinum crucible. The silica, iron and alumina, were then determined in the usual way with the results given below. The solution freed from iron and alumina yielded ·14 of lime by precipitation as oxalate.

Wishing to determine whether the iron existed in two states of oxidation, I treated portions of the powdered mineral in covered beakers with dilute HCl and dilute H_2SO_4. The pale yellow solutions so produced were tested with the red prussiate of potash but not the slightest change of color took place—shewing the entire absence of proto-compounds of iron.

The results of the Analysis, therefore, stand as below, in column *a*.

		a. analysis		*b*. theory
Water given off over oil of vitriol	11·58		8·85	
,, ,, at 150° C	7·22			
,, ,, by ignition	6·61		13·26	
		25·41		22·11
Silica		39·70		44·20
Peroxide of iron		21·94		23·57
Alumina		10·92		10·12
Lime		·14		
Alkalies and loss		1·89		
		100·00		100·00

These numbers agree as well, perhaps, as could be expected in the analyses of an amorphous mineral with those calculated from the following formula (which I have given in the column headed *b*) viz :—

$3\,(Fe_2H_6O_6\ 3\,SiO_2) + 2\ (Al_2H_6O_6\ 3\,SiO_2) + 15\ H_2O$, which formula may also be written $\mathfrak{R}_2H_6O_6\ 3\ SiO_2 + 3H_2\ O$ where $\mathfrak{R}$ is $\frac{3}{5}$ths iron and $\frac{2}{5}$ths aluminium.

A comparison of the above analytical results with the analyses given under Chloropal by Dana* shews that there is a very close correspondence between the Gramenite of Menzenberg, analysed by Bergemann and that from Smallacombe, as under :

	H_2O	SiO_2	Fe_2O_3	FeO	Al_2O_3	MgO	MnO	CaO	K_2O
Gramenite, *Menz.*	23·36	38·39	25·46	2·80	6.87	0·75	0·67	0 56	1·14
Gramenite, *Small.*	25·41	39·70	21·94	——	10·92	——	trace	0·14	1·89

The only difference of importance here, is, that between the relative proportions of Peroxide of Iron, and Alumina; the Gramenite of *Menzenberg* having considerably less than the theoretical quantity of Alumina—that from *Smallacombe* somewhat more.

In both cases, however, it seems to me that the proportion of alumina is much too great to be regarded as an accidental admixture, and, consequently, the mineral should not be classed as a mere *variety* of Chloropal, but should take rank as a *species*.

Dana gives the composition of the typical chloropals of Unghwar as below, in columns *a*, *b*, and the theoretical composition as in *c*, his proposed formula being $Fe_2O_3\ 3\ SiO_2 + 4\frac{1}{2}\ H_2O$, but the formula $Fe_2O_3\ 3\ SiO_2 + 5\ H_2O$, which may be written $Fe_2H_6O_6\ 3\ SiO_2 + 2\ H_2O$, agrees much better with his analysis as shewn in column *d*, if we take into account his admitted excess of silica and consequent deficiency of iron and water in the specimens analysed, and this, as will be seen, allows us to assign a convenient general formula to the whole Chloropal group.

	a	*b*	*c*	*d*
Silica	46·00	45·00	42·70	41·86
Peroxide of iron	33·00	32·00	38 00	37·21
Alumina	1·00	·75	——	——
Magnesia	2·00	2·00	——	——
Water	18·00	20·00	19·30	20·93
	100·00	99·75	100·00	100·00

* System of Mineralogy, p. 461. Anal. No. 16.

A careful consideration of the various analyses of minerals of the chloropal group given by Dana, leads me, therefore, to propose that the following species and varieties should be regarded as a series of types to which all future discoveries in the group may be referred.

Chloropal group—General Formula ... ... $R_2 H_6 O_6 3Si O_2 + 2H_2 O$
Chloropal ... ... $Fe_2 H_6 O_6 3Si O_2 + 2H_2 O$
Nontronite ... $(4\text{-}5\ Fe\ 1\text{-}5\ Al)_2 H_6 O_6 3Si O_2 + 2H_2 O$
Gramenite ... $(3\text{-}5\ Fe\ 2\text{-}5\ Al)_2 H_6 O_6 3Si O_2 + 2H_2 O$
*Keffekilite ... $(2\text{-}5\ Fe\ 3\text{-}5\ Al)_2 H_6 O_6 3Si O_2 + 2H_2 O$
Bole ... ... $(1\text{-}5\ Fe\ 4\text{-}5\ Al)_2 H_6 O_6 3Si O_2 + 2H_2 O$
**Montmorillonite ... ... $H_6 O_6 3Si O_2 + 2H_2 O$

The calculated percentages will then be as under:—

	Chloropal	Nontronite	Gramenite	Keffekilite	Bole	Montmorillonite
Silica ...	41·86	43·00	44·20	45·48	46·82	48·27
Peroxide of iron	37·21	30·58	23·57	16·17	8·32	——
Alumina ...	——	4·92	10·12	15·62	21·44	27·60
Water	20·93	21·50	22·11	22·73	23·42	24·13
	100·00	100·00	100·00	100·00	100·00	100·00

We may then include under *Chloropal*, the analyses 1, 2, 4, 5, 6, 10, 11, 12, 13, 15 (Chloropal, p. 461 *Dana*), several being admittedly impure specimens.

Under *Nontronite*, we have analyses 7, 8, 9 (Chloropal, p.461 *Dana*).

Under *Gramenite* we have analysis 16, and perhaps *Fettbol* analysis 17 (Chloropal, p. 461 *Dana*).

Under *Keffekilite* we have the analysis by John (Keffekilite, p. 478 *Dana*).

Under *Bole* we have analyses 16, 17, 18, 19, 20 (Lenzinite, p. 477 *Dana*), and analysis 11 (Montmorillonite [Erinite] p. 460 *Dana*).

Under *Montmorillonite* we have analyses 1, 2, 3, 4, 5, 6, 7, 8, 10 (Montmorillonite, p.p. 459-60 *Dana*).

The "*hardness*" of the whole group (excluding certain siliceous specimens of Chloropal, which pass into opal), will be below 2; the Sp. Gr. from 1·7 to 2·4; the color may be white or grey (Keffekilite), yellow (Nontronite, Bole), red or brown (Bole, Montmorillonite), green or yellowish green (Chloropal, Gramenite); all are opaque, usually compact or earthy, slightly unctuous, generally feebly adherent to the tongue, all are infusible and give off much neutral water in the closed tube.

* Dana, p. 478. ** Dana, p. 459.

Doubtless, it might be shewn, that the members of this group of highly hydrated ferric-aluminic silicates pass into each other in many instances by insensible gradations—but the extremes of the series are decidedly too far apart to allow of their being bronght together as one species, and I believe this simple mode of subdividing the group will be found convenient, without, in any way doing violence to nature, and, as it introduces no new names, I hope it will be accepted as a step in the elucidation and classification of the puzzling Clay group of Minerals.

DISCUSSION.

Dr. Le Neve Foster was glad to see the systematic grouping of minerals of related composition which Mr. Collins had suggested, and hoped that he would follow up the subject by working out other groups in a similar manner. In this way the science of Mineralogy might, he believed, be much simplified, and he would deserve the thanks of all Mineralogists.

Mr. Kitto would have preferred the entire abolition of some of the names, as there appeared to be very small differences between some of these amorphous substances, and specimens of the same variety from different localities would probably shew different results on analysis.

Mr. C. H. Richards, a visitor, asked whether the peculiar greenish color of the Smallacombe Gramenite might not be due to the presence of sulphate of iron.

Mr. Letcher expressed his gratification, as a student, at the convenient grouping which Mr. Collins had suggested.

Mr. Collins replying to Mr. Richards said, that the absence of an acid reaction with the water given off on heating the mineral in a matrass shewed the absence of sulphate of iron, or sulphuric acid in any form.

Replying to Mr. Kitto, he observed that it seemed hopeless to look for the abolition of names, unless the minerals to which they had been applied were proved to be identical in composition, or other properties. For example, when Prof. Church first noted the occurrence of Chloropal at Carn Grey, near St. Austell, he did not

think that name sufficient, and spoke of it as *that variety of Chloropal known as Gramenite.* In future, if his classification were adopted, it would be sufficient to call it Gramenite, as he had supplied a definite meaning for that term. No doubt Gramenites from different localities would still differ in composition, but the differences could not be great, or the mineral would cease to be Gramenite, and would naturally take its place as some other member of the group.

III.—"*On some New Mineral Localities in Cornwall and Devon.*"

By C. Le Neve Foster, B.A., D. Sc., F.G.S., *For. Sec.*

THOUGH some of the localities and minerals are of no great importance, I cannot help thinking that an accurate record of them may be of interest to members of the Mineralogical Society. Indeed, I consider it the duty of all Cornish members to supply notes upon various new localities, so that we may arrive, as nearly as possible, at a complete list of places where minerals occur, and thus supplement the valuable labours of Mr. J. H. Collins in his "Handbook to the Mineralogy of Cornwall and Devon."

It will be most convenient to take the various minerals alphabetically.

Apatite.—About two months ago I found this mineral occurring in the form of small six-sided prisms, with cassiterite and schorl, at the 130fms. level in Wheal Kitty, St. Agnes. Wheal Kine, now included in Polberro sett, is the only locality in the parish hitherto mentioned.

Bismuthine.—The occurrence of this mineral was pointed out to me by Capt. S. Bennetts while visiting some stopes above the 60fms. level at Penhalls Mine, in October last. Small needles of bismuthine are found in *vughs* in a rich tin lode, consisting of quartz, cassiterite, chlorite, iron pyrites, and a little copper pyrites.

Chiastolite.—While looking over the rubbish heap at Bosworgey mine, in St. Erth, Mr. T. B. Provis observed some curious markings in some pieces of the killas, to which he at once called my attention. On closer examination they were found to be caused by interlacing crystals which bore much resemblance to Chiastolite, though, apparently partly converted into mica. Mr. J. H. Collins kindly cut several sections of pieces of the rock, which leave little doubt that the mineral really is Chiastolite, although now partly altered. The crystals are square prisims $\frac{1}{8}$ to $\frac{1}{4}$ in. long, and $\frac{1}{50}$ in. on the side. I believe this is the first time that this mineral has been found in Cornwall.

Fluor-spar.—Though this mineral is such a common companion of the ores of tin and copper as to render it, perhaps, scarcely necessary to name every mine where it has been found, I think notice should be invariably be taken of localities where it has occurred in sufficient quantity to be of commercial importance. I, therefore, mention Bedford United and Tamar Valley mines near Tavistock. In the former, it is one of the constituents of an East and West Copper lode, whereas, at the latter, it accompanies galena in a vein running about North and South. From Tamar Valley mine, which is now abandoned, more than 1200 tons have been sold during the last three years.

Leucopyrite.—I am indebted to Capt. W. Tregay for some specimens from Pednandrea mine, Redruth, which I think I can identify with the mineral Leucopyrite. Though I cannot determine the form of the minute brilliant crystals which are grouped into globular aggregations, the appearance of the massive part and the behaviour of the mineral with reagents are characteristic.

The fracture presents a steel-grey colour, and the blowpipe reactions resemble those quoted for leucopyrite. It certainly is not mispickel, for when heated with $H N O_3$ it yields no sulphur, but merely a little white powder (no doubt $As_2 O_3$) which dissolves on boiling.

Mispickel.—For reasons given in the case of fluor-spar, I am induced to add a few localities to the long list already supplied by Mr. Collins. The mines which made sales of arsenical pyrites in 1875 were as follows:—Creegbrawse and Penkevil, Chacewater; Emmens United (Holmbush and Kelly Bray), Callington; Duchy Great Consols, Gunnislake; Florence and Tonkin, Callington; Wheal Newton, Harrowbarrow, and West Poldice, St. Day; Bedford Consols and Bedford United, Wheal Crebor, Franco Consols, Gawton, Lady Bertha, and Tavy Consols near Tavistock; Belstone near Okehampton; Old Bottle Hill and Wheal Mary Hutchings, Plympton.

Molybdenite.—In examining a little quartz vein traversing a little fallen block of tourmaline schist, on the beach near the junction of the granite and killas, in Hanover Cove, I was fortunate enough to discover a few scales of molybdenite. As far as I am aware, it has never before been found in the St. Agnes district.

Scheelite.—Although the tungstate of iron and manganese, or wolfram, is found in a great many Cornish mines, the tungstate of

lime, Scheelite, is decidedly rare. I am, therefore, glad to be able to note its occurrence at St. Just.

Mr. A. H. James, a few days ago, kindly sent me a small specimen of the massive mineral which was found on the *burrows* of Levant mine, in that parish. It is quite possible that a diligent searcher might be rewarded by discovering some crystals.

Tourmaline.—The occurrence of this mineral has been overlooked at many mines, I believe, from a want of knowledge of the fact that the hard dark-coloured rock so often found at the sides of lodes and locally known as *capel*, is very frequently nothing else but schorl rock, or an aggregate of quartz and schorl. The presence of schorl in tin *capels* was pointed out some forty years ago,* by Mr. R. W. Fox, and I have obtained evidence leading me to infer its existence in numerous cases where no schorl can be distinguished even with the aid of a lens. Having previously, in each case, determined the absence of copper, I find that most capels give a very decided green flame when tested for boracic acid by Turner's method.

In conclusion, I will add a word or two concerning the minerals locally termed *peach* in Cornwall. It has usually been taken for granted that all *peach* is chlorite. The *green peach* of the Cornish tin mines undoubtly is chlorite, but the so-called *blue peach*, which is so large a constituent of the tin lodes of such mines as Dolcoath, Cook's Kitchen, Carn Brea, West Basset, Phœnix, and many others, is probably a bluish-grey variety of tourmaline. I have not at present made any sufficiently close microscopic examination of the specimens of the fine-grained bluish-grey rock to be able to say whether or no my surmise is correct, but I may remark that every piece of *blue peach* which I have as yet tested by Turner's method, has afforded me evidence of the presence of boron.

DISCUSSION.

Mr. Collins said he had examined the crystals of Leucopyrite, from Pednandrea, under the microscope, but had not been able to make out their form on account of their extreme brilliancy. He had only been able to make out that there were triangular planes.

*Rep. R. Cornwall Polytechnic Soc., 1836, pp 86-7.

With regard to the sections of tin capels, exhibited by Dr. Foster, he thought the constant presence of schorl supported the theory of Von Buch and Daubrée, that the tin had been brought into the lodes as a fluoride, and accompanied by other compounds containing the element fluorine.

Mr. Barnett stated that specimens of the Scheelite, from Levant, had been mistaken for barytes.

Mr. Kitto mentioned that he had lately received a good specimen of pitchblende (exhibited) from one of the agents of East Pool, which had been met with in that mine. He believed it had not been recognized there before.

Mr. Cunnack, a visitor, said he had specimens of pitchblende, from East Wheal Lovell, in Wendron, this also was a new locality.

IV.—*A Defence of Turner's method of Detecting Boracic Acid.*

By C. Le Neve Foster, B.A., D. Sc., F.G.S., *For. Sec.*

A DEFENCE of Turner's method* seems at first sight to be quite unnecessary, for his test has been used over and over again, for upwards of fifty years, and, as far as I am aware, its usefulness has never been questioned till quite lately. Great was my surprise a few days ago to read a paragraph "On the uselessness of Turner's flux as applied to the detection of boracic acid."† Professor Chapman speaking of Turner's method, says:—"This test is much quoted in blowpipe books, and works on chemical analysis generally; but it is altogether superfluous. With borate of soda it fails entirely, or yields very unsatisfactory results; and although it answers for most other borates, and for borosilicates, it is uselessly applied to them, because these bodies colour the flame equally well *per se*." He quotes from Buzengeiger (*Annales des Mines*, 1829, tome v. p. 36), in support of these statements.

Surely, I said to myself on reading the article, the careful Plattner and my good friend and most painstaking teacher, Prof. Theodor Richter, would never have recommended Turner's method if they had not been convinced of its value. Besides, I have so often used the test myself with such marked results, that I feel quite satisfied that it is a useful one.

However, to fortify my conviction, and make quite sure that I have not been labouring under an optical delusion for the last seventeen years, I have lately made a series of tests, and I am glad to say that the reliance I have always placed on Turner's test does not appear to be unfounded.

*It consists in heating on Pt. wire before the blowpipe the powdered mineral mixed with a flux made of 4½ parts of bisulphate of potash, and 1 part of finely powdered fluor spar. If boric acid is present the flame is colored green.

†On some blowpipe-reactions, by Prof. E. J. Chapman. Canadian Journal, October, 1876.

My first experiments were made with a view to combat Prof. Chapman's assertion that "with borate of soda it (Turner's test) fails entirely, or yields very unsatisfactory results."

I suppose in speaking of "borate of soda," he refers to borax, and not to the neutral borate.

I first prepared some mixtures of borax and orthoclase, and then another series of borax and common salt. Some of the experiments were as follows:—

1. Borax mixed with 3 times its volume of Turner's flux, heated on Pt. wire in flame of Bunsen burner, imparts a very decided green colour to the flame.

2. Mixture of 97 parts by weight of orthoclase and 3 parts of borax, treated with flux in the same way. Distinct green coloration.

3. Mixture of equal parts by weight of borax and common salt, treated with flux in the same way. Decided green flame.

4. Mixture of 9 parts by weight of common salt and 1 part of borax, treated as before. Flame plainly coloured green.

5. Mixture of 98 parts by weight of common salt and 2 parts of borax, treated as before. By holding the Pt. wire close to the flame of the Bunsen burner, without quite touching it. I managed to tinge the edge of the flame a distinct green.

6. Mixture of 99 parts by weight of common salt and 1 part of borax, treated as before. By very carefully approaching the assay to the flame, I obtained a decided green coloration

As is well-known, the green coloration does not last long, but it is very plain and characteristic.

The facts I have just brought forward are surely sufficient proof of the delicacy of Turner's test, even in the presence of large quantities of sodium. In mixture No. 6 I only had 1 per cent. of borax, or about $\frac{1}{3}$ per cent, of boric acid ($B_2 O_3$), and yet I succeeded in obtaining a distinct reaction.

In all the above experiments I used a Bunsen burner, but as Prof. Chapman speaks of testing with the blowpipe flame, I tried several of my mixtures in that manner.

With No. 6 I failed to obtain a satisfactory coloration, but Nos. 4 and 5 gave a decided green. I need hardly say that to prevent any possibility of error on my part, I tested my Turner's flux alone and mixed with salt, and in neither case did I see any green tinge. Before using a piece of Pt. wire, I invariably tried it in the Bunsen

flame alone, and with Turner's flux, so as to make sure of its being perfectly clean.

Prof. Chapman's second assertion that most of the borates (save sodic borate) and boro-silicates colour the flame equally well *per se*, as when mixed with Turner's flux, does not at all agree with the results that I have obtained on various occasions.

I made some comparative tests as follows:—I pulverized some schorl and made part of the powder into a paste with water, and mixed the rest with Turner's flux, I then tested the two on Pt. wires simultaneously, at the opposite sides of the flame of the same Bunsen burner. The schorl alone gave at most a greenish yellow coloration, whilst when mixed with the flux, the green tinge, though evanescent, was very vivid.

Axinite treated *per se* before the blowpipe, in a darkened room, gives, it is true, a yellowish green colour to the flame, but the colour obtained by the use of Turner's flux is *to my eyes* far greener and more intense.

Axinite *per se* in the flame of the Bunsen burner does not give such decided results as in the blowpipe flame, but with Turner's flux I had not the slightest difficulty in securing a marked green coloration.

Such being the results of my experiments, I am almost at a loss to account for Prof. Chapman's statements. Two solutions of the difficulty may be suggested.

1. Prof. Chapman does not apply the test in exactly the same manner as I do. Having carefully prepared Turner's flux in accordance with Plattner's directions,* I invariably thoroughly incorporate 3 volumes of the flux with 1 volume of the finely pulverized mineral by *grinding the two together* in an agate mortar. I sometimes make the mixture into paste with water, and plaster it on to the loop of the Pt. wire; or else heat the Pt. wire, and dip it into mixture. On holding the assay at the tip of the blue flame before the blowpipe, or in the flame of the spirit lamp, or Bunsen burner, a vivid green colour appears, if boric acid is present, but as said before, the coloration lasts but a short time.

2. It is possible that the colour afforded by fluo-boric acid does not produce the same effect on the eyes of Prof. Chapman as it does upon those of most people. Berzelius himself was well aware

* Plattner's Probirkunst mit dem Löthrohre, 4te Auflage, 1865, p. 466.

of the fact that two persons do not always apply the same name to a certain colour. "For instance" he says, "Gahn would call a tint yellow or dark yellow which I should have called red, although we both agreed in the case of the pure primary colour, whether yellow or red."* This will, perhaps, explain to Prof. Chapman why Berzelius says nothing about the coloration afforded by certain minerals when treated before the blowpipe. It does not follow that he "overlooked the coloration of the flame," but knowing that some of his observations differed from those of his master, Gahn, he may have thought it better to omit the impressions produced on his eyes by certain flames, fearing that they would not agree with those produced on other people.

Of course, I do not for a moment impugn the accuracy of Prof. Chapman's results as far as he is individually concerned, but I still think that by the majority of blowpipe workers, or "pyrologists," as my friend Major Ross dubs us, Turner's test will be found to be eminently satisfactory.

* Translated from Berzelius' *Anwendung des Löthrohrs* Nürnberg 1821, p. 79.

V.—*On two new species recently described by Prof. von Lasaulx.*

By F. W. Rudler, F.G.S.

AT the last meeting of the British Association, Dr. A. von Lasaulx, who has recently been appointed Professor of Mineralogy in Breslau in succession to Professor Websky, exhibited two new minerals which he has described in the *Neues Jahrbuch*. A brief notice of these minerals may fitly find a place in the *Mineralogical Magazine*, although the original descriptions are too lengthy to be translated *in extenso*.

Melanophlogite.—This mineral was discovered by Professor von Lasaulx on specimens of sulphur from Girgenti in Sicily. It occurs in the form of small light-brown cubic crystals, associated with calcite and celestine. At first the mineral was taken for halite, and afterwards, when found to be insoluble, for fluorite. The cleavage, however, appears to be hexahedral. No other form than that of the cube is represented, and the cubes are shewn to be truly isotropic. Two cubes often interpenetrate each other; and the small crystals, aggregated together in chains, stretch from point to point of the scalenohedra of calcite. The colour is light brown or white; the lustre vitreous. H=6·5—7. In consequence of the small quantity of material, the S.G. could not be determined by ordinary methods. Dr. Bettendorff determined it, however, by suspension in a fluid of equal density, a solution of mercuric nitrate being employed for this purpose.

The quantity of the crystals examined was only 0.008 gram. The material was freed from associated calcite by means of hydrochloric acid, and from sulphur by treatment with carbon disulphide, while the celestine was removed by careful manipulation. In one determination the S.G. was 2·04, in another 2·03; temperature, 17.5°C. After heating, the density was reduced to 1·95. Heated B.B. the colour changes, first to yellowish grey, then to greyish

blue and finally to a deep lustrous blackish blue colour, whence the name. The analysis of melanophlogite is given as follows:—

SiO_2	=	86.29*
Fe_2O_3 / Al_2O_3	=	0·70
SrO	=	2·80
SO_3	=	7·20
H_2O	=	2·86
		90·85

The character of the sulphur combination appears to be doubtful, and it has been suggested that it may not exist as the radical of sulphuric acid, but as one of the thionic series. Arguments have been adduced against the notion that melanophlogite is a pseudomorph.

Mineralogists should carefully examine any specimens of Girgenti sulphur that they may happen to have in their collections, in order to detect, if possible, any minute cubes of the new mineral. With a larger quantity it will be well to re-examine its chemical constitution, which, as given in the foregoing analysis, certainly seems enigmatical. The original description will be found in the *Neues Jahrbuch* for 1876, Heft 3, pp. 250—257 ; Heft 6, pp. 627—629.

Aërinite.—A specimen in the Breslau Collection, labelled "Vivianite, from Spain," was examined by Professor von Lasaulx, and found to be destitute of phosphorus. Further research convinced the professor that he was dealing with an unknown mineral, and he has consequently given it a name suggestive of the intense blue colour which it exhibits. (ἀήρινος). So strong is this colour that sections had to be prepared of extreme thinness, in order to examine them by transmitted light. The mineral is for the most part compact in texture, but in places indistinctly fibrous. From its pleochroism, it is probably crystallizable in either the orthorhombic or one of the oblique systems. Streak, light bluish grey. H=3—4. Mean S.G.=3·0185. Examined spectroscopically it shews decided calcium lines, but only indications of sodium. It is readily attacked by acids, even in the cold, the blue colour being completely discharged. Treated with hot hydrochloric acid, white pulverulent silica is separated : the mineral thus differs from

*Mean of two determinations.

lazulite, which it resembles in colour. It does not become red B.B. like vivianite. The aërinite appears, on microscopic examination, to act as a cement, binding together fragments of quartz, olivine, felspar and augite. Freed, as far as possible, from foreign matter, the blue mineral was found to have the following composition :—

SiO_2	=	48·528
Al_2O_3	=	7·551
Fe_2O_3 / FeO	=	32·785
Mn_2O_3	=	1·167
CaO	=	3·586
MgO	=	0·900
H_2O	=	6·158
		100·675

By digestion for half an hour in hot hydrochloric acid a variable proportion of soluble matter was extracted, extending from 18·278 p.c., to 32·45 p.c. The soluble matter obtained from the experiment which yielded 18·278 p.c. was examined with the following results :

SiO_2	=	11·853
Al_2O_3	=	20·859
Fe_2O_3 / FeO	=	52·369
CaO	=	11·570
Mn_2O_3	=	2·834
MgO	=	0·409
		99.894

The impossibility of completely freeing the aërinite from associated impurities throws some uncertainty over these analyses. The mineral appears, however, to belong to the group of chloropals,* or to stand near Gillingite. It is evidently a product of the decomposition of other silicates. For the original description, consult the *Neues Jahrbuch*, 1876, Heft 4, pp. 352—358.

* It has, however, *much* less water than the minerals of the chloropal group. —J. H. C.

VI.—*Note on "Doubtful Minerals."*

By T. A. Readwin, F.G.S., M.R.I.A. &c.

THERE are found scattered up and down our Mineralogical and other literature, a great many names of Minerals which do not appear to have been satisfactorily determined, or of which very little is actually known.

Many of these minerals have been called *Doubtful*. The following list, I hope, will be inserted in the Magazine, so that the members of the Mineralogical Society and others interested may be able to supply more definite information concerning them.* It may be that members are in possession of facts unpublished, or not generally accessible; and, if so, it is hoped that they will give the required information in the pages of the Magazine.

Obviously, it is not my object to impugn the general accuracy of any of the authorities appearing in this long list; but the accumulation of the most reliable mineralogical data attainable, and the focusing of it, so to speak, where it may be seen by anybody interested.†

Acanthoide (Breislakite)
*Achmatite (? Epidote Crystals)
Acnite
Adelpholite of *Nordenskiold*
Adipocerite (? fatty substance of peat-mosses of coal measures)
*Ænigmatite (Kölbingite)
Ærugo (? Copper Rust)
*Agaric Mineral (Calcite)
*Agnesite of B. and Miller
Alm
Almagrerite of *Breithaupt*
Alum-Earth
Alumina, cupreous phosphate, *Domeyko*
Alumina, hyd-phosphate. *D. Forbes.*
*Alumina, native
Alumina, Saliferous hydrate
Aluminate Siliceous, of *Groningen* (Allophane)
Amausite (? Compact Felspar)
Ambrosine of *C. U. Shepard*
Amethystoline of *Brewster.*
*Amianthoide, *Hausmann*
Anchosine
*Antholite
*Antimonphyllite (? Valentinite)
Antozon Bleiglanz (Galena)
Apatord of *C. U. Shepard*
Apjohnite of *Glocker*
Aquacreptite of *C. U. Shepard*

*All such information may be sent either to Mr. T. A. Readwin, Tuebrook, Liverpool; or to the Secretary, Mr. J. H. Collins, 57, Lemon Street, Truro.

†All the substances marked (*) are briefly referred to in the last edition of Dana.

*Arræoxene, *v. Kobell* (Dechenite).
Argent en epis, of *Haüy*
Argillomurite of *Kirwan* (Magnesite)
*Arsenic Antimonial of *Schultz*
Arsenic Hydride
*Arsenosiderite of *Watts*
Arsenphyllite of *Breithaupt*
Asbestoid of *Humble*
Asphaltene of *Boussingault*
*Aspidolite of *F. v. Kobell*
Asterite of *Smart*
*Atlasite of *Breith* (? Chessylite)
*Attacolite of *C. W. Blomstrand*
*Augelite of ditto
Augite, Hydrous
Augite, Chrome (Diopside)
Augite, Asbestoidal (Augite)
Axe-stone (? Dark-green Jade)
Babiryte
*Bagrationite of *Hermann* (Epidote)
Bezoar Mineral. *J. Woodward*
Biphosphammite of *Shepard*
Bismutite of *Lindaker*
Bleischweif (? impure Galena)
*Bolivianite of *Breithaupt*
Boloretine
Bombite of *Leschenault* (Lydian Stone)
Bottlestone from Moravia (? Olivine)
Brass of South Wales
Breadalbanite (Hornblende)
*Brewsterlinite, of *Sir D. Brewster*
*Brown Spar (Dolomite)
*Bucaramangite. *Dana*
Bucaramanga Resin
Buhrstone
Butter of Bismuth
*Cabocle of *Damour*
*Cabrerite, *Dana*
Cadmia
Caliche of *Thomson*
Caliphite of *Thomson*
*Calstronbaryte of *Shepard* (Barytes)
*Calyptolite of *Shepard* (Zircon)
Canoxinite, *Bischoff*
Cantalite (? Translucent pitchstone)
*Carnatite of *Beud.* (? Carnatic Labradorite)
Carrolite of *Faber* (Linnæite)
*Cassinite of *J. Lea* (Orthoclase)
*Castillite
Catalina Stone from Newfoundland
*Catlinite of *C. T. Jackson*
*Celestobaryte of *Thomson* (Barytes)
*Centralassite of *How* (? Okenite)
*Cerinite of *How*
*Chalchihuitl of the Mexicans
Chantonite of *Shepard*
*Chelmsfordite, *Dana* (? Nuttalite)
Chionit
*Chladnite of *Shepard* (Enstatite)
Chlorite-earth (Clinochlore)
Chlorolithine (? Altered Felspar)
*Chrismatite, *Dana*
*Chromchlorite of *Hermann* (Kammererite)
Chromochlorite of *Thomson* (Serpentine)
Chrome-Ceylonite (Spinel)
*Chrysolite Titaniferous (? Boltonite)
Claussenite (Hydrargillite)
Cobalt, Horn (Erythrine)
Cobalt Nickel Glance
Cobalt Scorodite of *Lippman*
Cobalt Terarsenide of *Thomson*
Cologne-Earth
Conichalcite of *Breithaupt*
*Conichrite of *Thomson*
Conistonite
*Copperasine of *Shepard* (Jarosite)
Copper Diaspore (Phosphorocalcite)
Copper Vanadio-phosphate
Corn-Spar (Calcite)
Cottaite of *Breith.* (Felspar)
Coulobrasine of *Thomson*
Craie de Briançon
*Cryptolinite of *Brewster*
Cubanite of *Breith.*
*Cuivre spiciforme of *Haüy*
Culebrite
*Cuproplumbite of *Breith.* (Galena)
*Cyanochroite of *Dana*
*Cyanólite of *How* (? Centralassite)
*Dalarmite of *Breith.* (Mispickel)
Decacatritylene
Decatylene
Delarnite (Leucopyrite)
*Dendrites (? Arborescent Manganese Ores)
Diabantachronnyn of *Liebe.*
*Didymite of *Schafhäutl* (? Muscovite)
*Dinite of *Meneghini*

Dipyrite
*Dopplérite of *Haidinger*
Dragées de Tivoli (Pisolite)
Dumasite of *Delesse* (? Ripidolite)
Durangite of *C. J. Brush*
Duttenstein of *Mohs* (Limestone)
Dyripe of *Thomson*
Dyslytite of *Shepard* (? Schreibersite)
Einfach-arsenik-cobalt of *Kenngott*
*Elhuyarite of *Sach* (Allophane)
Eosite of *A. Schrauf*
Ephesite of *J. L. Smith* (? Lesleyite)
Epiboulangerite of *M. Websky*
*Epiphosphorite of *Breith.*
*Erlanite of *Breith.* (? Rock-mass)
*Erusibite of *Shepard* (Jarosite)
Eschwegite of *Dufrénoy* (Anthosiderite)
*Eucolite-Titanite of *Scheerer*
*Eukamptite of *Kengott*
Euphotide-Jadien of *Brongniardt*
Euphotide from the Alps
Euralite of *F. J. Wük* (? Delessite)
*Exanthalose of *Beudant* (Mirabilite)
Fahlerz Rothgiltigerz of the *Harz* (Miargyrite)
*Hard Fahlunite (Dichroite)
*Fauserite of *Breith*
*Feitzue of China (? Jadeite)
*Felsite (Labradorite)
Ferrite
*Ferrocalcite (Calcite)
Ferro-Ilmenite of *Hermann* (? Columbite)
*Fieldite of *Kengott* (? Tetrahedrite)
*Fluochlore of *Hermann*
Fluolite
Forbesite (? Annabergite)
Fossil Caoutchouc
Fossil Carbon
*Fournetite of *Ch. Mène* (Galena)
*Galapectite from Anglar (Halloysite)
*Gehlenite (Melilite)
Geyerite (Lölingite)
Gibsonite of *Haidinger* (Prehnite)
Globules of the Variolite of Durance (? Labradorite)
Goutte de Sang (Spinel)
Gouttes d'Eau (Topaz)
*Grahamite of *Wurtz*
*Graphic Granite (Orthoclase)
Graphit Schaumartiger (Wad)
*Greenlandite (Garnet)
*Groroilite (? Earthy Manganese)
*Grothite, *Dana* (Sphene).
Guanoxalate of *Shepard* (Guano)
Halloysite of St. Jean-de-Cole (Chloropal)
*Hartine of *Schrötter* (Xyloretinite)
*Hayesine of *D. Forbes* (Bechelite)
Heddlite
*Helminth of *Volger* (Ripidolite)
Helmintholite (Limestone)
*Helvetan of *R. T. Simmer*
Hematoconite (Calcite)
*Hepatinerz of *Breith.* (Cuprite)
*Herderite of *Haid.*
*Herrerite of *Herrera*
Herveleca of *Forchammer*
*Hessenbergite, *Dana*
*Hopeite of *Brewster*
Fusible Hornstone (? Orthoclase)
Hortonite (? Pseudomorph)
Hovite of *J. H. G. Gladstone*
Howardite (Meteorite)
*Huyssenite, *Dana*
*Hverlera of *Forchammer* (Clay)
Hyacynthine, *Brande*
*Hybeite of *Walterhausen*
*Hydroapatite of *Damour* (Apatite)
Hydrocalcite of *Krantz*
Hydrophilite
*Hydrosilicite, *v. Walt* (? Augite)
*Hydrotalc of *Necker* (Pennite)
Hyposulphite of Magnesia (Meteorite)
*Hypoxanthite of *Rowney* (? Yellow Ochre)
Hystatique of *Breith* (Calcite)
*Iberite of *Svanberg* (? Gigantolite)
Idryl of *Bodeker*
*Ildefonsite (? Tantalite)
Indian Red from Persian Gulf
Infusorial Earth from Ebsdorf (? Triplite)
Iodolite of *C. U. Shepard* (Meteorite)
*Iridium of *Krantz*
Iron Carbono-phosphate
*Iron-Earth of *Gmelin*
Iron-Foam (Earthy Hematite)
Iron Native Organic Salts o
Iron-shot Copper Green (Chrysocolla)

Islemannite of *H. Höfer*
Ivigtite of *J. D. Rand*
*Jalpaite (? Argentite)
*Jaulingite, v. *Zepharovich.*
*β Jaulingite (Do.)
*Jelletite (Garnet)
*Jenzschite (Opal)
Joketan of *Breith.* (Clay)
Juvenas Meteorite
Kabook from Ceylon ? (Argillaceous Hematite)
*Kainite of *Zinken* ? (Impure Picromerite)
Kalicine of *Pisani*
*Kaliphite of *Ivanoff* (Limonite)
Kalyptolite of *Shepard* (? Garnet)
Keityoit (Spodumene)
Kevil from Derbyshire
Kinsigite of *Fischer*
Kir from Caspian Sea
Klapperstein (Clay Ironstone)
Klaprotholite of *G. J. Brush* (? Wittichenite)
Kochelite of *M. Websky*
Koodilite of *Dufrénoy* (Thomsonite)
*Koreite of *Dufrénoy* (Labradorite)
Korite of *Walterhausen* (Pelagonite)
Koth
*Kremersite, *Dana*
Kröeberite of *D. Forbes* ? (Pyrrholite)
Kryokonite of *Nordenskiold*
Kunkur (Tufa)
*Kupferblende (Tennantite)
Lasurapatite of *Nordens.* (Apatite)
Lead-Earth (Cerussite)
Lead, Iodiferous or Jodblei
*Leedsite of *Thomson*
Leptonemerz of *Breith.* (? Pyrolusite)
*Leucanterite of *Shepard* (Jarosite)
*Leucocylite (Apophyllite)
*Leucophane
Leutrite of *Sartorius* (Marl)
*Lherzolite (? Green Augite)
*Liebenerite (? Gieseckite)
Lignite Resin
*Ligurite of *Dufrénoy* (Sphene)
Lime Vanadate
Lime and Copper phosphate
Lime and Copper Vanadate
Livingstonite of *Senar M. Barcena* (? Stibnite)
Lodulite (Orthoclase)
*Loganite of *Hunt* (Pennine)
*Loganite (Pyrosclerite)
*Lotalite *Dana* (Hedenbergite)
Lucullite (Fetid Limestone)
Luscite (Pyrargillite)
*Magnesium Chloride of *Scacchi*
*Magnetic Iron Sand (Magnetite)
*Mamanite of *A. Goebel*
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*Marcylite of *Shepard* ? (Atacamite)
Margode of *Nicholson*
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*Massicot, *Dana*
Meerschaum from Taberg & Sala (Serpentine)
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Melaxoite
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*Meroxite
*Metaxorite of *Arppe* (? Metaxite)
Meteoric Dust
Meteoric Mud
*Micarelle of *Abildgaard* (? Scapolite)
*Michaelsonite of *Dana*
*Mineral Charcoal of *Dr. Rowney*
Moffrasite of *Leymere* (Bleinierite)
*Molisite of *Brande*
Molybdanuran
*Montanite of *F. A. Genth*
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Morpholites from Sweden
Mother of Diaspore (Agalmatolite)
*Monrolite
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*Mysorine (? Impure Malachite)
*Nacrite of *Vauquelin* (Lepidomelane)
Nantokite of *W. Hermann*
Nasumite of *D. Forbes.*
Native Coke (Anthracite)
*Native Magnet
Native Nickeliferous Iron
Native Steel Iron
Native Vermillion
Necrolites
*Neft-gil of *Fritzsche* (? Zietrisikite)

*Neoctese (Scorodite)
*Neotype of *Breith.* (Natrocalcite)
*Nepaulite
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*Neurolite of *T. S. Hunt* (? Agalmatolite)
*Nickel-Antimon-arsenical
Nicklerz of *C. Bergemann*
*Nickel Vitriol of *T. S. Hunt*
*Nipholite of *Nicol* (Chiolite)
Nitrammite
*Nitrocalcite of *Shepard*
Nitrogenous Hydrocarbon
*Nitromagnesite of *Shepard*
*Noralite, *Dana* (Hornblende)
*Nordmarkite, *Dana* (? Staurolite)
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Nova Mina (Topaz)
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Ochre, Cadmium
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Organic Salts of Iron, *Berz.*
Orileyite of *D. Waldie*
*Ornithite of *Julien* (? Metabrushite)
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Orthoclase, Rubidium
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Pallas Meteorite
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Parastite of *Walt.* (Epistilbite)
*Parophite *Watts* (Agalmatolite)
*Partschite of *Shepard* (? Magnesite)
*Partzite of *Arents.* (? Stibiconite)
*Passauite (? altered Ekebergite)
*Pattersonite of *J. Lea*
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Titano-oxide Chromifere (Rutile)
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*Wasite of *J. F. Bahr*
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*Zinkazurite of *Breith.*
*Zinkosite of *Breith.*
Zorodon of *Bonjeau*
Zwitter from Altenberg

VII.—"*Analysis of Stilbite of an unusual form, from Faröe.*"

By Professor Heddle, M.D., *Vice-President.*

At the foot of the terminal and almost inaccessible cliff of the hill—name unknown—which towers immediately to the south west of the harbour of Waii or Hoiwig, in Bordöe, Faröe, the writer obtained the specimen—a single one—of which the following is an analysis:

The island of Bordöe, like the most of Faröe, is built up of strata of bedded trap with mural cliffs, which alternate with terraces of grass clad debris. At this part of the island, the terraced trap consists of a wackenitic "claystone," which is very friable, light in colour, easily disintegrated, and in places tufaceous in aspect. Its amygdaloidal druses are very few and far between.

The specimen referred to consisted of a number of rosette bundles of crystals, each of which radiated from a proterogenetic crystal of Heulandite. Both minerals were translucent and colourless.

Each individual of these rosette bundles was about five eighths of an inch in length, by one sixteenth in each of the other directions. To the eye they appeared square prisms for the most part, a few being rectangular prisms; there were two pearly faces, which were the bounding planes of the *longer* diagonals of the rectangular prisms. These pearly faces were also the faces of most perfect cleavage.

The goniometer gave angles of 90°, both for the lateral planes and for the one terminal.

The specimen was set aside as either one of faröelite in giant crystals, or as Thomsonite—the only specimen thereof found in the islands: but as the position of the pearly face was anomalous, the mineral was lately analysed.

The Sp.-gr.=2·103.

1·7243 grammes decomposed by HCl yielded

Silica	58·79
Alumina	14·613
Ferric Oxide	·47
Lime	9·534
Potash	·232
Soda	·324
Water	17·298
	101·261

The alkalies were determined by Lawrence Smith's method.

This is not in itself a very satisfactory analysis—nor is it a very typical one; still it leaves no question that the mineral is *Stilbite—primary* stilbite. Very different indeed in habit from the generality of stilbite in Faröe; the mineral being there, with the exception of the specimens from one locality, of a well-marked "sheafy" habit.

At the excepted locality, namely the great cave in Nälsöe, as also at Storr in Skye, stilbite occurs in primary crystals; but in these the brachydiagonal is pronouncedly the short diagonal, for the crystals are thin,—like scales, and lustrous on the broad surfaces. At the Hoiwig locality, that which crystallographically is the brachydiagonal in the ordinary positioning of the crystal, is sometimes crystallometrically the macrodiagonal.

The only other Zeolite, or indeed mineral, which was found at Hoiwig, was Chabasite, which occurred in large-sized, well-developed crystals, also of the primary form.

Reviews and Notices.

Journal for Crystallography and Mineralogy. (Zeitschrift für Krystallographie und Mineralogie.)

WE learn with much pleasure that a Journal is to be published in Leipsic for the purpose of furnishing a complete repertory of all discoveries and investigations relating to Crystallography and Mineralogy. The first number will appear this month, and as soon as there is sufficient material at hand others will follow. Each will consist of about 100 pages, 8vo, and six parts will complete a volume in nine months or a year. The volumes will not cost more than 30s. a piece. Prof. Groth, of Strasburg, has undertaken the duties of Editor, and he has been promised the co-operation of many distinguished crystallographers and mineralogists in all parts of the world. We propose giving our readers abstracts of all important papers, so that they may be kept thoroughly *au fait* with the progress of the science of mineralogy.

Plattner's Assaying with the Blowpipe; 5th Edition, Leipsic, 1877. *(Plattner's Probirkunst mit dem Löthrohre; fünfte Auflage Leipzig*, 1877.*)*

THE first part of the new edition of Plattner's standard work, which has just been issued, comprises about one-fifth only of the entire book. The second and concluding part is in the press and will be published at Easter this year.

As in the case of the previous edition, it is to Prof. Richter, Director of the Freiberg School of Mines, that we are indebted for having revised, enlarged, and improved the original work. The amount of new matter, however, in the first part, seems to be small, and has been introduced at the expense of some portions of the previous edition, for the 144 pages of the new edition cover the same ground as 148 of the old. This diminution in size is partly due to the use of smaller type in places. Among the additions we notice descriptions of stands for holding blowpipe nozzles steady, further details on the use of the Bunsen burner, Foster's substitute for pieces of charcoal, and Rüger's and Kleritj's instruments for ascertaining the weight of small buttons of gold and silver. We may here remark that Griffin's name should have been mentioned in

connection with the biscuit supports for charcoal pastilles, as the support proposed by Foster is merely a modification of that invented by Griffin many years ago and figured in his "Chemical Handicraft," p. 366.

Among the re-agents not included in the list given in the 4th edition are gypsum, used in testing for lithium and boron, the mixture of potassic iodide and sulphur for detecting bismuth, and magnesium, instead of sodium, for Bunsen's test for phosphoric acid. On the other hand two re-agents, formerly recommended, are omitted, viz., oxalate of nickel and tincture of galls.

As illustrative of the difficulty of recognising the less conspicuously coloured flames, we remark that the colouring produced by metallic antimony formerly, included among the blue flames, is now placed under the head of the green. Some standard of colour, such as the colour-gauge devised by Mr. Otto Radde,* seems to be requisite, and especially in the case of coloured beads, for on p. 103 we are told that oxide of manganese imparts a light carmine-red colour to a microcosmic salt bead (O.F. cold), whereas on p. 125 the colour is said to be a reddish-violet.

Reference is made in a note to the labours of Emerson, G. Rose, Sorby, and Wunder, with regard to crystals formed in borax beads, but we are surprised to find that no notice whatever is taken of Major Ross' work on "Pyrology." Surely Prof. Richter must have seen the book, and we should have liked to have heard his opinion, that of the greatest authority living for such matters, on Major Ross' new methods of testing the aluminium plate as a support, use of boric acid and phosphoric acids as re-agents, &c. Prof. Richter's tendency seems to be to restrict rather than increase the application of boric acid, for in speaking of its uses he omits to notice its employment for Berzelius' test for phosphoric acid, which is mentioned in the previous edition. No doubt the test will be fully described in the latter part of the work, and hence the omission while speaking of the use of the re-agent. We are glad to see that he advises that the fused boric acid should be kept in fragments, and not in powder as was formerly recommended. We look forward anxiously to the completion of the work, when perhaps some remarks will be made on Major Ross' methods of assaying, both qualitatively and quantitatively.

* Jour. Soc. Arts, 15 Dec., 1876. p. 69.

Obituary.

MR. DAVID FORBES, F.R.S., &c., was a brother of the late Edward Forbes, the eminent naturalist. They belonged to a Scotch family, descended from Lord President Forbes, which had been compelled to remove to the Isle of Man, on account of having taken the side of the Pretender. Mr. David Forbes was at one time assistant to the late Dr. George Wilson, of Edinburgh, and was subsequently a partner in the firm of Evans & Askin, of Birmingham, the great miners and manufacturers of nickel. For some years he resided in Norway, taking charge of the extensive mines belonging to the firm; and both his natural tastes and business requirements led him to study in great detail the mineral riches of that country. This was when still so young, that, on being presented to the king, his majesty could not imagine that so young a man could be *the* Mr. Forbes, and enquired after his father. During his residence in Norway, he discovered new sites for extensive mines, and some new minerals, of which tyrite was one, described in papers published in Norwegian Journals, as well as in several English periodicals. He afterwards resided in Birmingham, and one of his chief duties was to inspect the mines belonging to his firm in various parts of the world, which gave him most excellent opportunities for the study of mineralogy. Partly in the interests of business, and partly for the advancement of science, he passed several years in South America, and went through almost all sorts of adventures. He was at Mendoza very soon after the disastrous earthquake, and made a report on it for the native government. He was also mixed up in some of the revolutionary wars, was captain of a troop of Pampas horsemen, was wounded, and was near taken prisoner, but escaped with some others in an open boat, the tiny crew being compelled to make sails of their clothing. He afterwards went on a long voyage in a native vessel, all the while paying every possible attention to geology and mineralogy. Nothing having been heard of him for a long time, his friends concluded that he was dead; but all on a sudden he turned up again. After having made every arrangement for a

scientific exploration of some little known parts of South America, and even having secured his passage, he suddenly changed his mind, married a very young wife, and in the course of a year or two took up his residence in London, as a mining engineer, quickly rising to the very highest eminence in that profession. His house in York Place, Portman Square, contained a most complete laboratory, having every appliance for chemical analysis, an admirable collection of rocks and minerals, and an extensive library of nearly all the English and Foreign works related to his science. He became one of the secretaries of the Geological Society, and the foreign secretary of the Iron and Steel Institute, for both of which posts his great experience made him in every way most suitable. In the latter capacity he wrote a series of half-yearly reports on the iron and steel industries all over the world,—a task for which his linguistic knowledge fitted him in a remarkable manner. These duties and his professional engagements occupied so much of his time, that he failed to adequately make known the vast amount of information stored up in his memory, and contained in his voluminous note books. Though his contributions to the science of mineralogy have been very considerable, it is a matter of deep regret that he was not spared to retire into less active life, and publish the results of so many years of travel and study. During his residence in South America, he suffered from a fever, which returned at regular intervals; and was finally, in great measure, the cause of his death. Two or three years ago he was also stricken by a sun stroke, while travelling in Spain, and the death of his wife in the early part of this year, was to him a sad blow, from which he never recovered. He leaves a young family, who must be comfortably provided for. By his death, which took place at his residence, on Tuesday, Dec. 14th, we have lost, at the age of 51, one of that most valuable type of mineralogists, who combine great practical experience, both in the field and in the laboratory.—H. C. S.

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